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National Ventilating Company

Natural ventilation by the National system

[New York]

[c1905]

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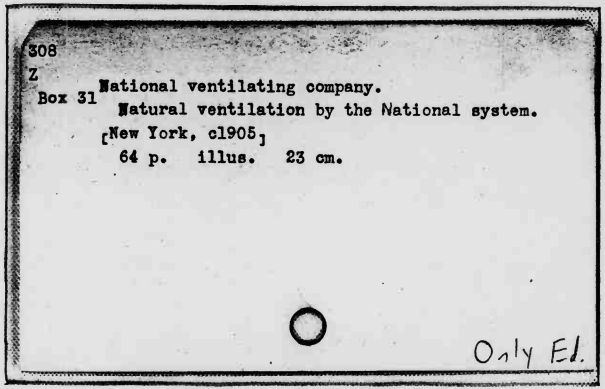

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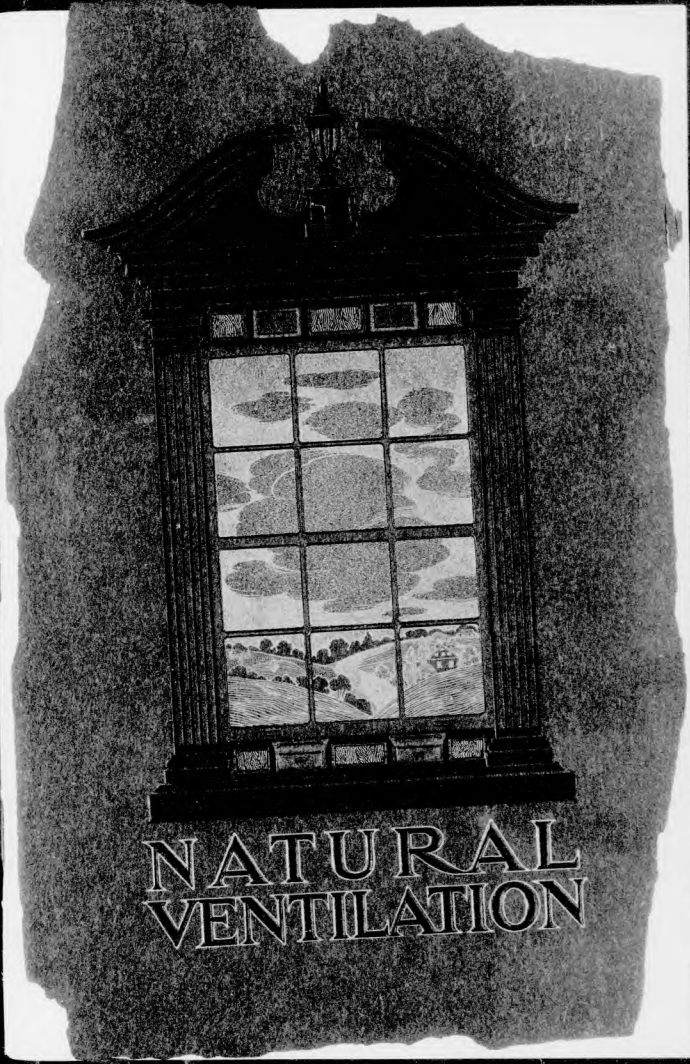
NATURAL
VENTILATION

45
N21
308
Z
Box 31

Natural Ventilation

by the National System

National Ventilating Company

General Offices

One Madison Avenue New York

Branch Offices

BOSTON: 811 Paddock Building
PHILADELPHIA: 512 Heed Building
BALTIMORE: 349 Equitable Building
CHICAGO: Knisely Bros. Building
PITTSBURG: 715 Empire Building
ROCHESTER: 6 Gibbs Street

FACTORY: Harrison New Jersey

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Chasmar-Winchell Press New York and Pittsburg

A CORNER OF THE CAPITOL, ALBANY, NEW YORK

Importance of Fresh Air

"IF," says a well-known writer, "you ever have a chance to go to the museum in connection with the Edinburgh University, of which Andrew Carnegie is Lord Rector, or Chief Ranger, or something of the sort, you will see some strange objects in a glass case that will do more to teach you the value of fresh air than all the books ever written.

"Last year a professor secured the lungs of an Esquimau, a Londoner, and a coal miner. By some chemical process he preserved them, and they are now side by side in a glass case. The Esquimau's lungs are pure white, the Londoner's a dirty brown, and the coal miner's a jet black. The Esquimau had kept his lungs clean, not because he knew more about breathing than the Londoner or the coal miner, but because he lived in a dustless, germless atmosphere and passed his time in the open air."

It is true that we who run up and down the dusty canyons of American cities have no chance to breathe the pure, exhilarating atmosphere of the Arctic regions; but it is equally true that there is usually a far greater difference between the quality of the air of our offices and homes and that of the outside air, than between the external air of any city and that of Alaska or Greenland.

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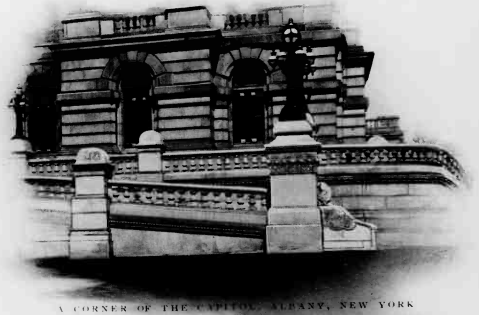

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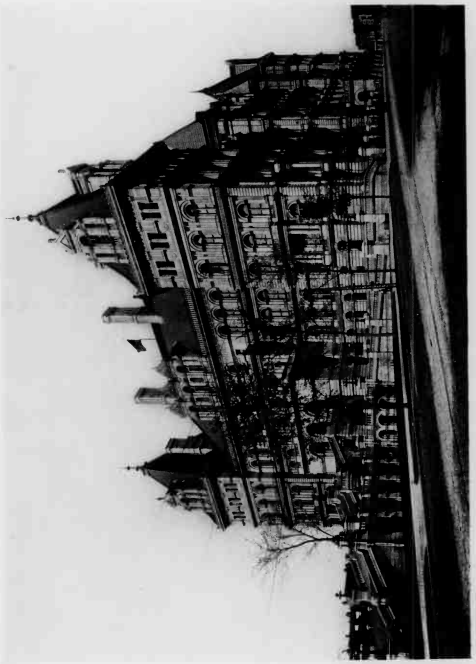

THE CAPITOL, ALBANY, NEW YORK

STATE HOSPITAL, ROCHESTER, NEW YORK

The Common Tendency

There is too great a tendency, even among those who consider themselves enlightened, to shut out this most vital element of life. As Benjamin Franklin said in a letter to Dr. Ingenhaus, physician to the Emperor of Austria: "Some are as much afraid of fresh air as persons in the hydrophobia are of fresh water." In consequence of this fear, insufficient air supply and bad ventilation are the rule rather than the exception in our banks, offices and public buildings, to say nothing of our homes.

Too often, and indeed as a rule, we go to our places of business and earn our daily bread in a foul, debilitating atmosphere, that is not only disagreeable and uncomfortable but positively injurious. We go to church or to the theatre and breathe over and over the foul products of other people's breath, and come away with a feeling of weariness and ennui, often accompanied by headache. We send our children to school, and wonder why they feel dull and enervated on their return. We sleep in rooms either too small or from which the night air is excluded, failing to realize that "no common air from without is so unwholesome as air within a closed room that has been often breathed and not changed." (1)

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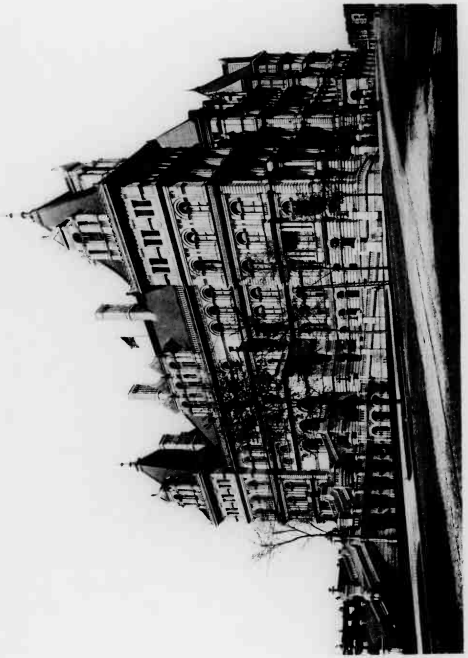

THE SUPERIOR, DURAND, NEW YORK

STATE HOSPITAL, ROCHESTER, NEW YORK

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Prevailing Foulness

The exceedingly bad atmospheric conditions that prevail in most churches, theatres, etc., are proven by the experiments of Professor S. H. Woodbridge in various buildings in Boston. While the limit of permissible impurity in the air, as set by competent authority, is 6 parts of carbon-dioxide in 10,000 parts of air, Professor Woodbridge's experiments demonstrated that the air of the gallery of Trinity Church greatly exceeded this limit, while that of the Young Men's Christian Association contained as high as 36.43 parts per 10,000, and that of some of the leading theatres of Boston contained on an average over 40 parts of carbonic acid gas in 10,000 parts of air. (1) It goes without saying, that such an atmosphere is more than uncomfortable and disagreeable; it is positively injurious to health, often leading to fatal results. (2)

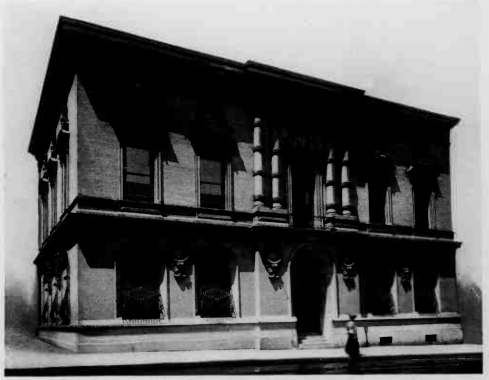
MERCHANTS BANK OF ROCHESTER, NEW YORK

See testimonial, page 53

(1) See *Technology Quarterly*, Vol. II, No. 2.

(2) "Health is only possible when to other conditions is added that of a proper supply of fresh air. * * * Statistical inquiries prove beyond a doubt that of the causes of death which are usually in action, impurity of the air is the most important." (Edmund A. Parkes, M. D., F. R. S., on "Ventilation.")

"It would have been a startling announcement a few years ago to have stated that impure air caused as many deaths and as much sickness as all other causes combined, and yet the most diligent investigations are rapidly approaching that conclusion." * * * * "We are forced to the conclusion that about *forty per cent. of all deaths* that are constantly occurring *are due to the influence of foul air.*" (Lewis W. Leeds, in "Treatise on Ventilation.")



UNITED TRACTION COMPANY, ALBANY, NEW YORK

Consumption Due to Foul Air

Every year more than 200,000 human beings die of consumption in this country alone. Dr. Koch, the distinguished bacteriologist, in a startling paper read before a recent tuberculosis congress in London, emphasized the fact that consumption is almost entirely the result of breathing impure air, and declared that proper attention to the all-important subject of ventilation would contribute both to the prevention and the cure of this most fearful scourge of the human race.

It is fresh air (oxygen) that transforms in the lungs the impure venous blood into pure arterial blood. It is fresh air that eliminates the waste tissue and builds up the new. *Per contra*, foul air lowers the vitality, increases the liability to disease and its severity, decreases the mental and physical working power of the individual, and inevitably shortens life. In other words, on the freshness and purity of the air depend the oxygenation and purity of the blood. On the purity of the blood depends the health of the entire body. If, then,

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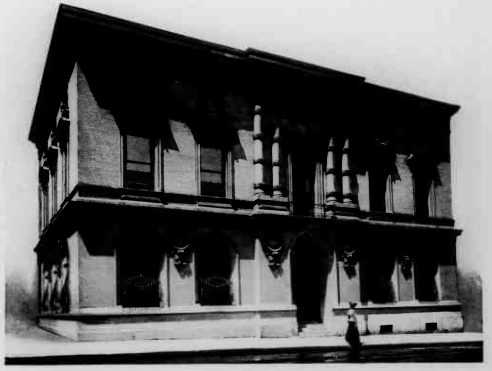
(2) "Health is only possible when no other conditions are adopted that will be injurious to it. . . . Of fresh air . . . a continual injurious impression is produced. . . . A habitual want of fresh air . . . is one of the most powerful causes of ill-health which are known. . . . Impurity of the air . . . is the most important [cause]." — Edmund A. Parkes, M. D., F. R. S., on "Ventilation."

"It would have been a startling announcement a few years ago to have stated that impure air caused as many deaths and as much sickness as all other causes combined, and yet the most different investigations are rapidly approximating that conclusion. . . . We are forced to the conclusion that about *half* the deaths . . . and illness that are constantly occurring *are due to the influence of bad air*." — Letter of Dr. Hoadly, on "Practical Ventilation."



CHELSEA FIBRE-STONE COMPANY, ALBANY, NEW YORK

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the lungs instead of absorbing pure, vitalizing air, feed upon a debilitating, carbon-vitiated atmosphere, the injury to the blood, brain and body is manifest.

Carbonic acid, that is, air which has been deprived of oxygen through the process of breathing, is a virulent and deadly poison. Just as a man in case of drowning or hanging, dies in a few minutes if he cannot exhale or throw off the carbonic acid, so a room occupied by human beings becomes a place of discomfort, disease and death unless the products of respiration be removed or diluted with fresh air.

Startling Examples

Who has not heard of the horrors of the Black Hole of Calcutta, where, in 1857, during the Sepoy mutiny, 146 Europeans were shut up in a room scarcely 20 feet square. The torments they endured in that rank and noisome atmosphere were evidenced by the fact that after a night of unspeakable suffering, 123 of the 146 men were found dead, while the remaining 23 survived only to endure a life of pain and wretchedness.

During a storm at sea a number of years ago, the captain of the steamer Londonderry, through sheer ignorance of the consequences, shut up his passengers in a close cabin without ventilation. As in the case of the Black Hole of Calcutta, the agonies and torments, shrieks and curses that speedily followed are beyond description. When the hatches were removed, the captain found 72 of his 200 passengers dead and others dying.

Another striking case was that of the captured soldiers at Austerlitz, where 300 of them were shut up in a small cellar, and within a few hours all but 40 were dead.

These illustrations serve to portray the dire effects of breathing over and over the foul and poisonous products of respiration, and to prove that the air which has passed through the human lungs is a deadly poison that ought to be treated as excreta and gotten rid of at the earliest possible moment.

The Insidious Effects of Bad Air

The foregoing examples of the danger of breathing foul air are of course extreme. Under ordinary conditions, unless the impurity of the air is very considerable, the evil effects of inhaling it again and again are not such as to be

THE ALBANY TRUST COMPANY

See testimonial, page 58

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THE ALBANY TRUST COMPANY

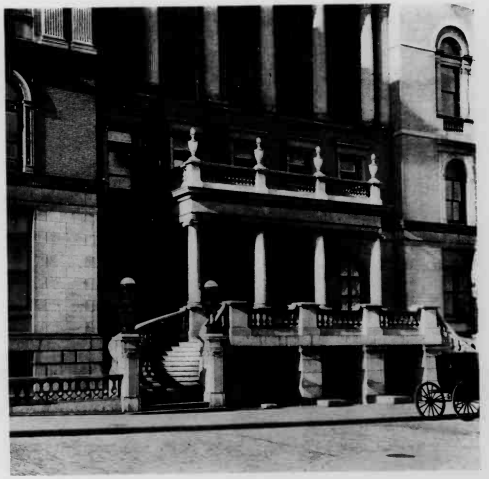
See testimonial, page 52

immediately noticeable. But the injury caused by breathing air deficient in oxygen and contaminated by respiratory excrement, is cumulative. Its work is silent but deadly. Its effects are not perceptible until after a considerable time has elapsed and much damage has been done, and are then usually attributed to other causes.

It has been by careful and long-continued observation of the effects of insufficient air supply and poor ventilation upon large bodies of men subject to it, and by comparison of statistics covering considerable periods of time, that the evils of breathing vitiated air have been made manifest. This proof has been obtained from comparing the statistics of the sickness and death occurring through a series of years among men in well-ventilated and also in ill-ventilated barracks, prisons, hospitals, etc.

These investigations show that "death rates have been reduced by the introduction of efficient ventilating systems: In children's hospitals, from 50 to 5 per cent.; in surgical wards of general hospitals, from 44 to 13 per cent.; and in army hospitals, from 23 to 6 per cent. Prison records show reduced death rates, chiefly as the result of

COMMONWEALTH TRUST COMPANY, BOSTON



THE STATE HOUSE, BOSTON

effective ventilation; in one case, from the yearly average of eighty deaths to one of eight, each period covering the same and a considerable number of years." (1)

If, then, proper ventilation works such wonders in effecting cures, how much greater must be its value in preventing disease?

Of Interest to Employers

Commenting on this general subject, a writer for *Domestic Engineering* states that it has been demonstrated again and again that vitiated air causes sluggishness, ennui, etc., among brain workers, and that a very appreciable increase in the amount of work turned out by a given number of men

(1) "Notes on Ventilation and Heating," by Professor S. H. Woodbridge, Massachusetts Institute of Technology, Boston, Mass.

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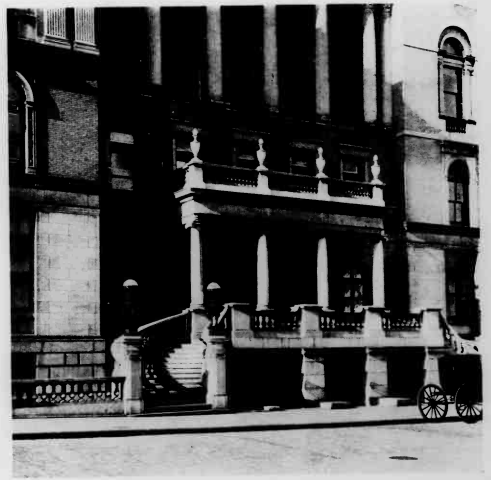

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invariably results from improved ventilation. Therefore, employers of labor should realize the fact that efficient ventilation not only adds to the health and comfort of their employés, but enhances their capacity to do more and better work.

The Best Method

Being thus brought to a realizing sense of the exhilarating and vitalizing effects of fresh air, we should consider carefully the best method of providing an adequate supply in our public buildings, offices and homes.

It goes without saying that under any system of ventilation, natural or artificial, the prime object should be the constant and complete changing of the air, at the same time guarding against strong draughts and sudden chills, which are often as objectionable and dangerous to life and health as the foul air itself. "It is well, therefore," as an eminent authority says, "to lay emphasis on the fact that the reckless opening of windows does not constitute good ventilation, though it may give a good supply of fresh air." (1)

OFFICE OF THE STANDARD GAS LIGHT COMPANY, NEW YORK

See testimonial, page 60

(1) "Ventilation," by W. Noel Hadley, F.R.S.E., F.C.S., Professor King's College, London, England.

MONROE COUNTY ALMSHOUSE, ROCHESTER, NEW YORK

See testimonials, page 52

Authoritative Statements

In determining what is the best method of ventilation, it will prove of value to analyze the recent "Report of the Select Committee on Ventilation," (1) appointed by the British House of Commons, which embodies the latest expressions of the most eminent authorities.

A careful reading of this report justifies the declaration of Houghton: "Science proves that there is not a moment of time but when there is a movement of air, and that this movement properly utilized is sufficient at all times to change the air in a building and secure ventilation." This sweeping statement is endorsed by Dr. Parkes, an equally high

(1) Composed of Sir Michael Foster, M. P., F. R. S. (Chairman); Victor Christian William Cavendish, Esq., M. P.; John Dillon, Esq., M. P.; Robert Farquharson, Esq., M. P., M. D., D. L.; Sir John Batty Tuke, M. P., M. D.; Daniel Ford Goddard, Esq., M. P., and Abel Henry Smith, Esq., M. P.

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Natural Ventilation Approved

The report accepts the assertion that: "When natural ventilation is properly and scientifically applied it invariably proves more successful than mechanical or other forms of artificial ventilation, and it has the advantage that it cannot get out of order or break down, and costs but little to apply and maintain."

This view is confirmed by another high authority, Dr. John Hayward, who says: "Natural ventilation is certainly much to be preferred to any and every artificial system, and it is, of course, much less complicated. It also involves very little original outlay and no permanent cost for maintenance."

THE TRADERS NATIONAL BANK OF ROCHESTER

See testimonial, page 53

OFFICES OF THE STANDARD SANITARY MANUFACTURING COMPANY, PITTSBURG

See testimonial, page 62

Sir Douglas Galton, F. R. S., gives like testimony: "It is far better to trust to the ventilation of nature — natural ventilation — than to the artificial methods of pumping in of air."

Artificial Ventilation Unsatisfactory

It is made evident by this report of the Select Committee that "the inefficiency of the extraction and propulsion fans in the House of Commons, the lack of freshness of the air —causing in the members a lassitude and feeling of heaviness which tends to interfere with the due performance of their duties—and the draughts complained of," are inherent and inseparable features of all mechanical or other forms of artificial ventilation; all going to prove that mechanical ventilation can never be made either as efficient and healthful, or nearly so agreeable, as natural or spontaneous ventilation.

In perfect agreement with the foregoing is the report of the findings of the committee of the Buffalo School Association, which made a scientific investigation of the sanitary condition of the public schools of that city, thirty or more of which are equipped with mechanical systems of ventilation.

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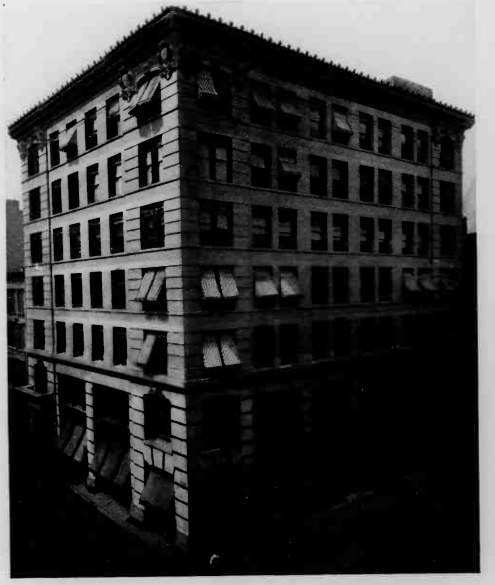
Mechanical Ventilation a Failure

This report (see the *Buffalo Medical Journal*, August, 1901) declares that "the fan system of ventilation is a failure in inlet work, a more pronounced failure in outlet work, a failure in diffusion, a failure in displacement, a failure in the removal of air-borne excrement, a failure in the removal of carbon-dioxide." Also that "141 different observations made in the rooms of seven schools showed not one instance of efficient ventilation as measured by motion of the air at the outlets," and that "in the test of 196 different rooms of nine schools there were found 165 failures, as indicated by the amount of carbon-dioxide."

NEW YORK OFFICE OF GINN & COMPANY, PUBLISHERS

See testimonial, page 62



ANSONIA BRASS AND COPPER COMPANY AND ANSONIA CLOCK COMPANY
John and Cliff Streets, New York

See testimonials, page 51

A Rational Conclusion

Now hear the conclusion of the whole matter: All scientific investigations concerning the best methods of ventilation are summed up by Professor Wade, of Oxford University, lecturer on hygiene, when he says: *"Ventilation can only be successfully accomplished at all times when it is effected without assistance from mechanical or artificial contrivances. However perfect these may appear, they can never achieve results superior to those insured by judicious and intelligent adaptation of natural means."*

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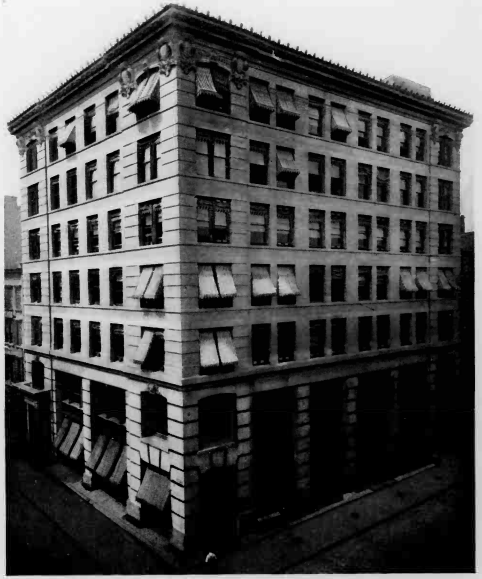
NEW YORK OFFICE OF GINN & COMPANY, PUBLISHERS
See testimonials, page 82



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The National System of Natural Ventilation

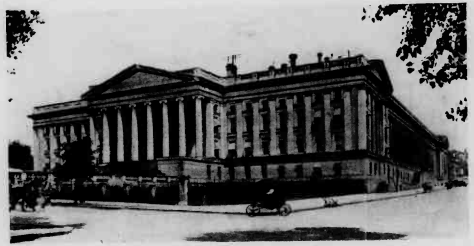
THE National System of Natural Ventilation is presented as being at once simple, practical, adaptable, economical and beyond all, efficient. It meets fully the true idea of perfect ventilation as expounded by Professor S. H. Woodbridge, which is "to inject and extract only a moderate excess (of air)—say five to ten times as much—over that actually used, and to do so in such a manner that

"First—The exhalations do not mix with the fresh air supply, and

"Second—The inflow is properly diffused and does not pass directly to the outlets in merely local currents or draughts."

He says further:

"The only ideally perfect ventilation consists in inducing a regular up-current from a level below that of the human head up to the extraction outlets at the ceiling." (This is precisely what the National System of Natural Ventilation accomplishes.) "Under this system the bulk of fresh air *required* to be admitted" (to accomplish perfect ventilation) "is immensely reduced, as *is also the expense of warming it to any degree considered desirable.*"



UNITED STATES TREASURY BUILDING, WASHINGTON, D. C.

The following Divisions of the Treasury Department are ventilated by the National System: Offices of the Supervising Architect, Treasurer of the United States, Comptroller of the Currency, Auditor for the Treasury Department, Chief of the Division of Appointments, Commissioner of Internal Revenue, Chief Clerk of the Treasury Department, and Superintendent of the Building.

The Ideal Method

Sir Douglas Galton, in dealing with this question of fresh air supply says: "If the fresh air could but have free access to each person in an assembly, and the warm columns of air arising from the body, and expelled from the lungs, were continually drawn off at the roof, to where they naturally ascend, and not permitted to return to be rebreathed, 100 cubic feet of air per hour per person would be amply sufficient, and ideal ventilation would be achieved." (1)

Any one familiar with the National System knows that these are precisely the conditions it secures. Each occupant of the room warms the air that surrounds him; it rises above his head and escapes through *the extraction ventilators*, and its place is supplied by *the intake ventilators*, with cooler air untainted by the vitiated air which rises out and away from it, and thus perfect ventilation is secured without draught, and without a sudden or material lowering of the temperature. (2)

Overwhelming Testimony

The overwhelming testimony of the best authorities against the use of mechanical or artificial ventilation in any form, and in favor of natural ventilation intelligently and scientifically applied, should lead everyone who is at all interested in the subject to consider the remarkable results secured by the National System of Natural Ventilation, as shown by the testimony of those who speak from personal knowledge, and to consider also the character and standing of the witnesses. (See pages 51 to 64.)

(1) "The amount of fresh air introduced by the National System is limited only by the amount of radiation provided to warm it." (See letter of C. V. Lodge, page 52.)

(2) Professor Shaw, in his evidence before the Select Committee of the House of Commons, said: "Before going on to express my opinion about the application of the system of ventilation to the particular case of the House of Commons, I would like to point out one circumstance which seems to me to be extremely important, and is sometimes overlooked—that is to say, that each individual in a room is a source of warmth to the air which surrounds him, and he does, as a matter of fact, distribute the air largely for himself. He warms the air that surrounds him; it rises above his head, and its place is supplied by cooler air from somewhere or other. * * * He is himself a ventilating machine. * * * I think it is an extremely satisfactory way of assisting the automatic distribution of air which the individuals themselves produce."

The *Building News*, in commenting upon this statement, declares: "Professor Shaw here clearly defines one of the primary and most important elements in natural or automatic ventilation."

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Description of the

National System of Natural Ventilation

as Applied to Buildings

Figure 1. Exterior

Figure 2. Interior
MOBILE HOOD

THE principle of the National System is to provide a larger number of small openings for the intake and extraction of the air, rather than a small number of large openings, and to admit the air in an indirect way, thoroughly diffusing it in such a manner as to eliminate extraneous matter and preclude draughts.

The System consists primarily of two units, the Mobile Ventilator, placed at the bottom, and the Victor Ventilator, placed at the top of the window.

The Mobile Ventilator in turn consists of two parts, the hood (Figs. 1 and 2) and the air diffusion box (Figs. 3 and 4).

The hood, which projects into the open air, is provided with a two-winged valve pivoted at a point between its two

Figure 3. Exterior

Figure 4. Interior

AIR DIFFUSION BOX

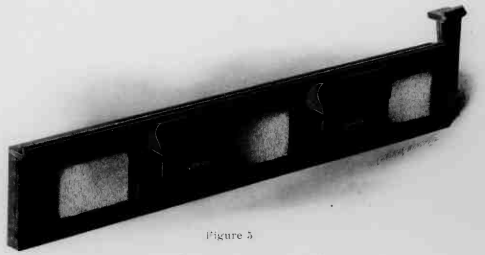

Figure 5

INSIDE VIEW OF GLAZED PANEL INSTALLATION,
SHOWING AIR DIFFUSION BOXES

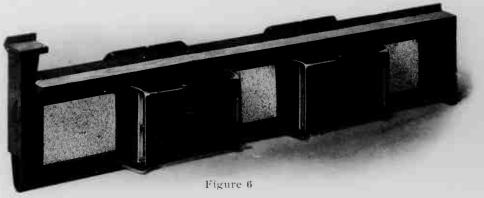

Figure 6

OUTSIDE VIEW OF GLAZED PANEL INSTALLATION,
SHOWING MOBILE VENTILATING HOODS

The panel is held in place in the window frame by the wedge piece at the end. No nails or screws are required, and no cutting or alteration of the window. The entire panel may be removed instantly by simply raising the wedge and lifting out the panel.

ends. When a current of air strikes either wing of the valve, the wing receiving the impact immediately closes, effectually preventing all ingress of air from that end, at the same time opening the opposite end of the hood. The closed wing of the valve then acts as a deflector or reflector of the air, producing a counter current which enters the leeward end of the hood, *without dust, dirt or moisture*, such elements being of necessity swept along by the stronger current of air, while that entering the open end of the hood, being weaker, is freed of all extraneous matter. This will be

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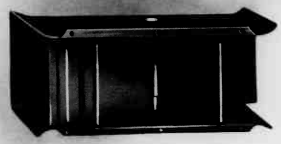

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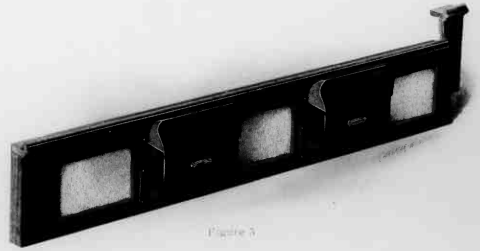

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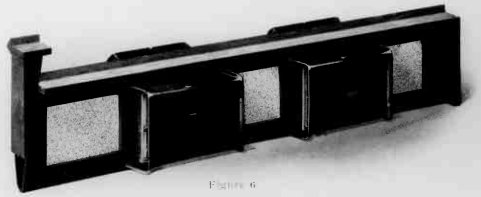

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Figure 7. Exterior

Figure 8. Interior
VICTOR HOOD

better understood by the illustration of a rapid-running muddy brook. When the water strikes a projecting rock and is deflected around it, the water immediately behind the rock is clear, the mud and heavier particles being carried along by the stronger current.

The air being thus broken in its force, and freed from extraneous matter, passes from the hood to the air diffusion box, where it is broken up into jets by a coarse screen, deflected upward and diffused without cross draught. In fact, it will be found that the upward flow of the air through the diffusion box creates an induced current of warm air *from the room toward the window*, so that any one may sit close to the window without being exposed to a cold draught, while those in the center or farther end of the room secure equally the benefits of the fresh air admitted. The air diffusion box is provided with a piano-hinge shutter, by which the air supply can at all times be regulated and controlled at will.

One or more of these hoods and air diffusion boxes are mounted on a glazed panel (Figs. 5 and 6) corresponding in length with the width of the window, and finished to harmonize with the wood trim thereof. The panel is then installed beneath the lower sash of the window (see Figs. 12 to 15); or the devices are mounted directly upon the sash rail (Figs. 9 and 10); or, in the case of a fixed window, as also in that of a pivoted sash, the devices are mounted on a skeleton frame (Fig. 17) installed directly in the glass (Fig. 18).

The Victor Ventilator (Figs. 7 and 8), which is placed at the top of the window, either on panels (Figs. 13 and 15),

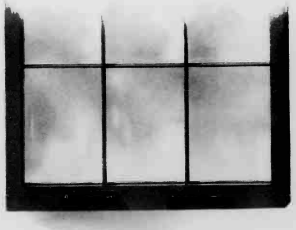
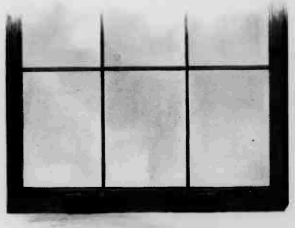


Figure 9. Outside
SASH-RAIL INSTALLATION

directly upon the sash rail, or upon skeleton frames (Figs. 16 and 18), is so constructed as to best extract the foul and vitiated air.

The System, then, works as follows: The Mobile Ventilators at the bottom of the window admit the fresh air without draught, dust, smoke, or other extraneous matter. The air current is deflected upward, and having been broken up by its passage through the screen in the diffusion box, unites promptly with the warm air of the room, replacing the foul air that is drawn off by the Victor Ventilators at the top of the window. Thus the conditions for securing ideal ventilation, as defined by Professor Woodbridge, are fully provided. In his "Report on the Heating and Ventilation of the Senate Wing of the United States Capitol, Washington, D. C.," he says: "Ventilation by removal *is the most perfect of all methods*, both in the completeness of its work and *in the economy of its operation*. The nearest possible approach in practice to ventilation of occupied rooms by the removal method is found when one is surrounded by cool, pure, quiet and abundant air, which the heat of the body can freely move in an approaching and enveloping and ascending current about and from the body."



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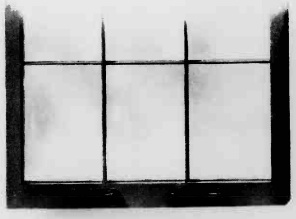

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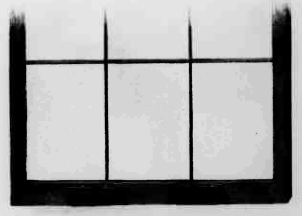

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SASH-RAIL INSTALLATION

The number and size of the devices,

whether placed upon panels or mounted in the sash rail, or in the glass, depend upon the number and width of the windows, the size of the room, and the average number of its occupants. Usually one ventilator is placed at the top and another at the bottom of each window less than 36 inches wide. In windows 37 to 58 inches, two ventilators are placed at the top and two at the bottom of each. In windows 59 to 80 inches wide, three ventilators are placed both at the top and bottom; or, approximately, one ventilator to each 19 inches of width of the window.

In new construction, where ventilators are to be mounted upon the sash rail, it is desirable to have the rail specified extra wide to allow for proper installation. It is even more desirable in new construction to provide stationary panels upon which to mount the devices. (See Figs. 14 and 15.)

Figs. 19 and 20 present methods of equipping new buildings, both of which will give positive satisfaction.

When the panels are placed in old windows, they naturally cause an opening at the meeting rails, as shown in illustrations on pages 26 and 27. To prevent the air from entering at this opening, a specially devised weather strip, which effectually closes the aperture, is furnished with the ventilators.

When it is desirable to lock the windows, as upon the ground floor or where the windows are easily accessible, a special lock is provided, by which either the top or bottom sash, or both, may be locked at any point.

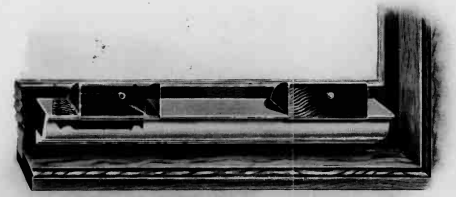

Figure 11
SPECIAL FORM CONTINUOUS DIFFUSION BOX

Ventilation of Bedrooms and Bath Rooms

A MODERN BATH ROOM VENTILATED BY THE NATIONAL SYSTEM*

ALL medical authorities agree that the lack of the proper ventilation of the dwelling is the greatest known cause of sickness and disease.

The popular fear of night air is unwarranted. Far more wholesome is the night air, even from a filthy street, than that of a close room which has been breathed again and again and so become laden with carbonic acid and other poisonous products of the breath. As a noted authority says: "It is not in the external air that we must look for the greatest impurities, but it is in our own houses that the blighting, withering curse of foul air is to be found."

Unless the lungs are supplied during the night with the proper amount of oxygen to purify the blood, one awakes in the morning with a general sense of unfitness, increasing to nausea and headache. Every tissue of the body—especially those of the brain—are devitalized, and we are in a condition to succumb to any contagion to which we may be exposed.

During the greater part of the year, on account of the danger of strong draughts and sudden lowering of the temperature and the blowing in of rain or snow, the windows of the bedroom cannot be relied upon as a satisfactory or safe means of ventilation. Consequently, the facility in supplying perfect ventilation and yet avoiding all draughts, makes the National System particularly acceptable in the bedroom.

Constant and perfect ventilation of the bath room is imperative in order to carry off any sewer gas generated in the plumbing system. The most dangerous and deadly sewer gases are often wholly inodorous, and are therefore not noticeable.

The National System of Ventilation operates *constantly*, day and night, providing at all times an adequate supply of fresh air, without draught, and extracting the foul air, thus keeping bath rooms and bedrooms clean and wholesome.

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*Copyrighted illustration used by the courtesy of the Standard Sanitary Manufacturing Company, Pittsburg, Pa.

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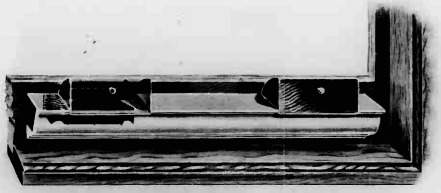

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A MODERN BATH ROOM VENTILATED BY THE NATIONAL SYSTEM*

ALL medical authorities agree that the lack of the proper ventilation of the dwelling is the greatest known cause of sickness and disease.

The popular fear of night air is unwarranted. Far more wholesome is the night air, even from a filthy street, than that of a close room which has been breathed again and again and so become laden with carbonic acid and other poisonous products of the breath. As a noted authority says: "It is not in the external air that we must look for the greatest impurities, but it is in our own houses that the blighting, withering curse of foul air is to be found."

Unless the lungs are supplied during the night with the proper amount of oxygen to purify the blood, one awakes in the morning with a general sense of unfitness, increasing to nausea and headache. Every tissue of the body—especially those of the brain—are devitalized, and we are in a condition to succumb to any contagion to which we may be exposed.

During the greater part of the year, on account of the danger of strong draughts and sudden lowering of the temperature and the blowing in of rain or snow, the windows of the bedroom cannot be relied upon as a satisfactory or safe means of ventilation. Consequently, the facility in supplying perfect ventilation and yet avoiding all draughts, makes the National System particularly acceptable in the bedroom.

Constant and perfect ventilation of the bath room is imperative in order to carry off any sewer gas generated in the plumbing system. The most dangerous and deadly sewer gases are often wholly inodorous, and are therefore not noticeable.

The National System of Ventilation operates *constantly*, day and night, providing at all times an adequate supply of fresh air, without draught, and extracting the foul air, thus keeping bath rooms and bedrooms clean and wholesome.

*Copyrighted illustration used by the courtesy of the Standard Sanitary Manufacturing Company, Pittsburg, Pa.

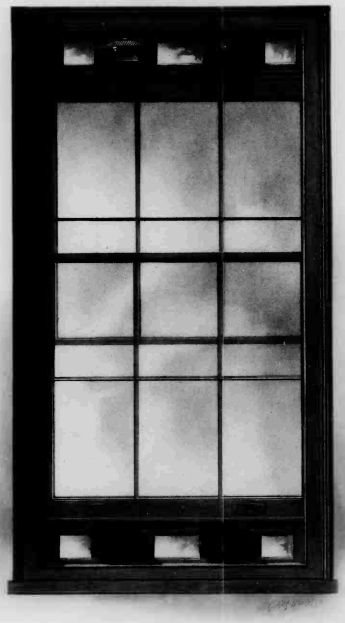

Figure 12. Inside View

MOBILE AND VICTOR VENTILATORS

Installed in old construction. Devices mounted on glazed panels, finished to harmonize with the woodwork of the window, inside and out.

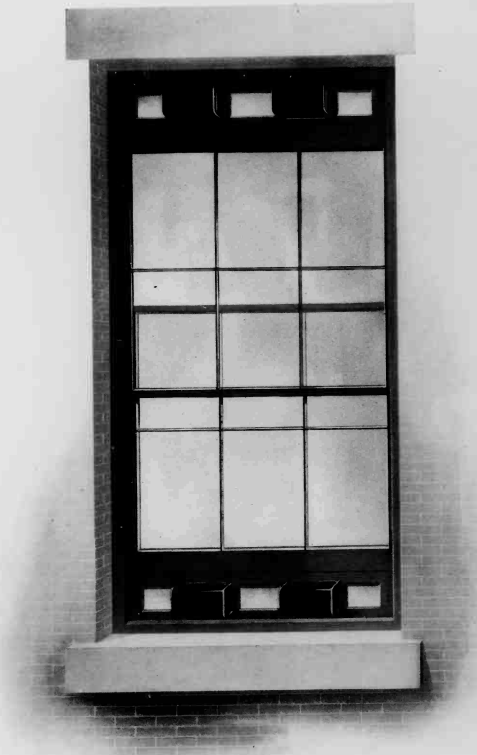

Figure 13. Outside View

MOBILE AND VICTOR VENTILATORS

Installed in old construction. (See preceding page.)

Figure 12 Inside View
MOBILE AND VICTOR VENTILATORS
Installed in old construction. Decices mounted on glazed panels, finished to harmonize with the woodwork of the window, inside and out.

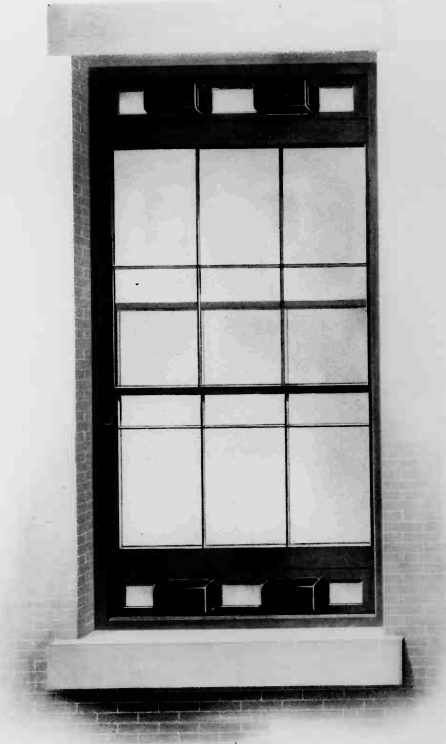

Figure 13 Outside View
MOBILE AND VICTOR VENTILATORS
Installed in old construction. (See preceding page.)

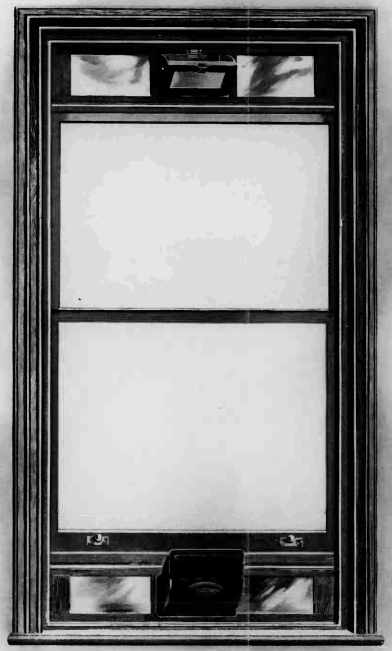

Figure 14. Inside View

MOBILE AND VICTOR VENTILATORS

Applied to new construction. Devices mounted on glazed panels, finished to harmonize with the woodwork of the window, inside and out

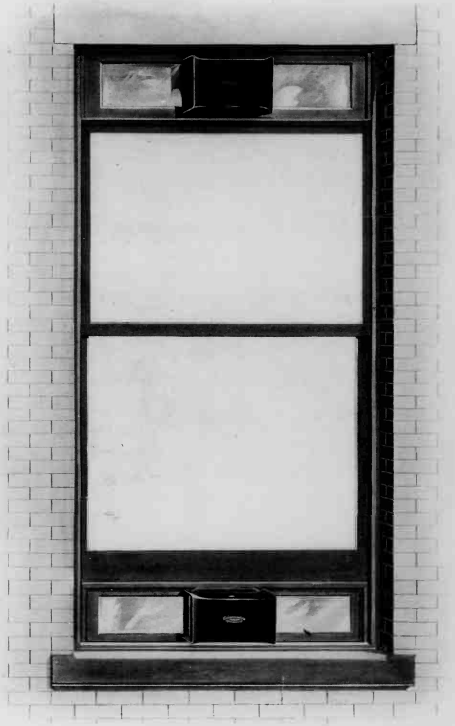

Figure 15. Outside View

MOBILE AND VICTOR VENTILATORS

Applied to new construction. (See preceding page.)

Figure 14. Inside View

MOBILE AND VICTOR VENTILATORS

Applied to new construction. Devices mounted on glazed panels, finished to harmonize with the woodwork of the window, inside and out

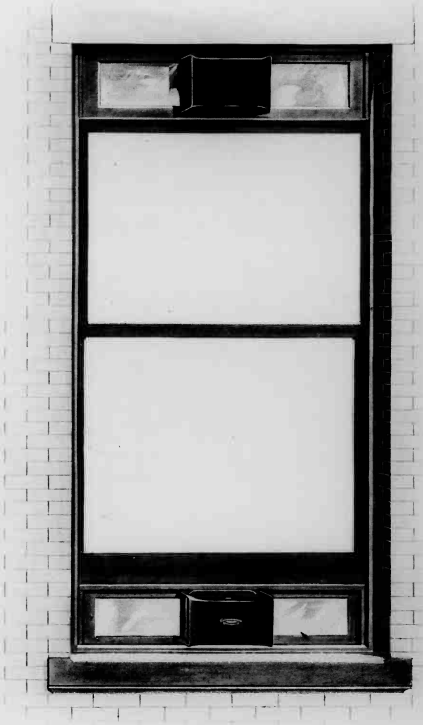

Figure 15. Outside View

MOBILE AND VICTOR VENTILATORS

Applied to new construction. (See preceding page.)

Skeleton Panel Equipment

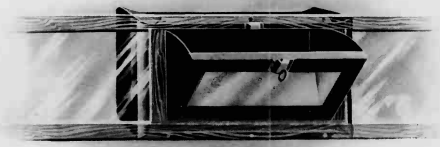

Figure 16. Interior View
VICTOR VENTILATOR COMPLETE
Mounted on a skeleton panel and installed directly in the glass

Many buildings are provided with fixed plate glass windows that will not permit the entrance of any air, while many others are equipped with swinging windows that cannot be opened during inclement weather without creating intolerable draughts. The skeleton panel installation of the National System of Ventilation is a sure cure for both of these conditions, and has met with the greatest success. (See illustrations on pages 10, 12, 14, 15, 16 and 31.)

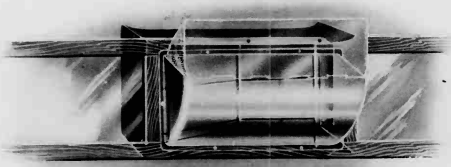

Figure 17. Interior View
MOBILE VENTILATOR COMPLETE
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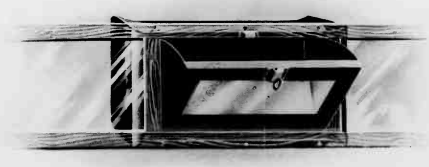
Figure 18. Exterior View
National devices installed in a fixed plate glass window

Skeleton Panel Equipment



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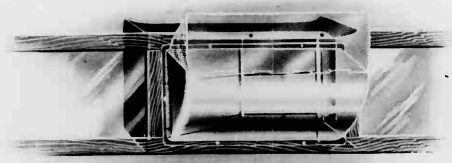

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MOBILE VENTILATOR COMPLETE
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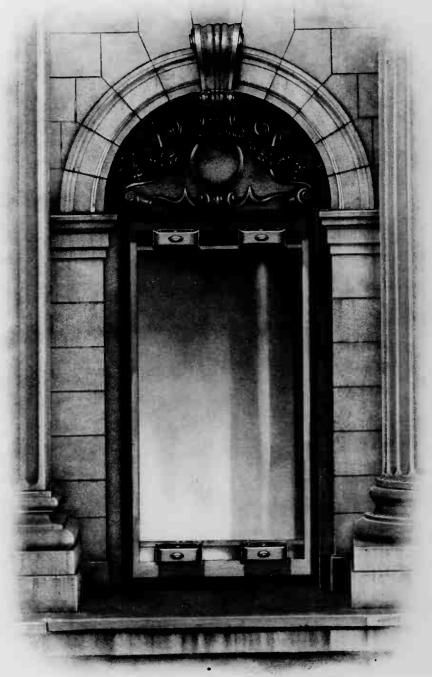

Figure 18. Exterior View
National devices installed in a fixed plate glass window

Figure 19. Sectional View

MOBILE HOOD AND DIFFUSION BOX INSTALLED IN THE WALL OF A BUILDING

This method of equipment gives the most positive and satisfactory results. It is particularly adapted to the ventilation of theatres, warehouses, photographic dark rooms, fireproof vaults, etc.

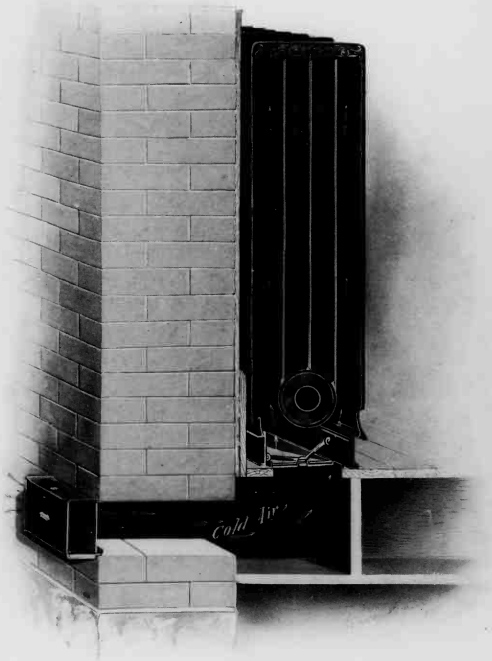

Figure 20. Sectional View

MOBILE HOOD APPLIED TO A DIRECT-INDIRECT RADIATOR

Another practical method of supplying fresh air, free from extraneous matter, and one that eliminates the danger of the radiator bursting, which occurs frequently under the ordinary method of admitting the cold air directly to the radiator.

Figure 19. Sectional View

MOBILE HOOD AND DIFFUSION BOX INSTALLED IN THE WALL OF A BUILDING

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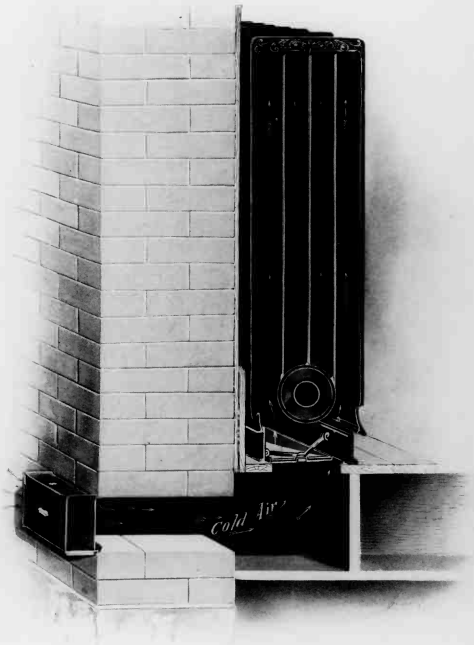

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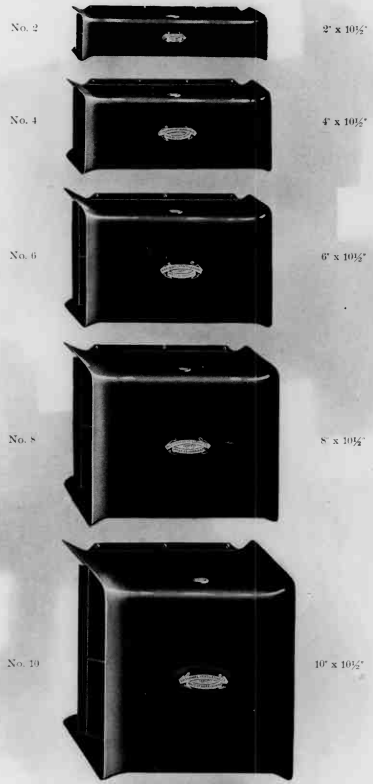
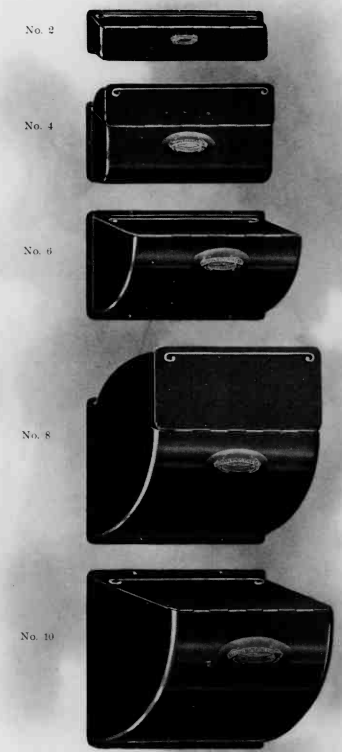


COMPARATIVE SIZES OF MOBILE HOODS

Made in steel, with enamel finish.
Made in brass, natural or polished.
Made in copper, with natural or verd-antique finish.



COMPARATIVE SIZES OF AIR DIFFUSION BOXES

Made in steel, with gun metal or oxidized finish.
Made in brass, polished, gun metal, or verd-antique finish.

No. 2 2" x 10½"

No. 4 4" x 10½"

No. 6 6" x 10½"

No. 8 8" x 10½"

No. 10 10" x 10½"

COMPARATIVE SIZES OF MODEL HOODS

Made in white enamel finish
Made in brass, nickel or oxidized copper finish

No. 2

No. 4

No. 6

No. 8

No. 10

COMPARATIVE SIZES OF AIR DIFFUSION HOODS

Made in white enamel or steel finish
Made in brass, nickel or oxidized copper finish

How to Measure Windows

WE prefer to have a representative measure the windows to be equipped with ventilators, but where this is not feasible the observance of the following directions will enable us to furnish estimates and also to supply the proper equipment, which may be easily installed by any local carpenter.

Make a diagram of the room or rooms to be ventilated, showing the size thereof and the location and number of windows in each. State on the diagram the exposure, whether north, south, east or west—one or more, as the case may be ; also the purpose for which each room is used, the average number of occupants thereof, and how it is heated.

Raise the lower sash about half way. Cut a piece of cardboard the exact width of the sash runway. Mark one end of this card "Up." Slip the upper end about half its length into the groove (between the sash and the frame). Then with a pencil trace upon the card the bevel or shape of the bottom of the sash rail. (See diagram on opposite page, reference figure 4.)

Measure the exact inside width of the window frame between the two side runways of the sash. (See diagram, reference figure 1.) Note this and all other measurements of the window on the back of the card.

Measure the exact width of the side runway, *i. e.*, the groove in which the sash slides. (See diagram, reference figure 3.)

Measure the thickness or height of the window stool, including any weather strip thereon. (See diagram, reference figure 2.)

State on the card the finish or color of the inside of the window *frame*, and also the color of the *sash* on the outside.

Give your preference as to the glass to be used in the panel, *i. e.*, whether clear or ripple. Ripple glass is

preferable for all upper panels, as it softens the light, and for both upper and lower panels in bedrooms and bath rooms, as it also obstructs the view from the outside. For offices, libraries, etc., we recommend ripple glass above and plain glass below.

NOTE 1—Each window that is to be equipped should be separately measured, as nearly all windows vary in some particular.

NOTE 2—To save time and expense in the installation of panels, number the windows on your diagram and number each card (bearing bevel, measurements and inside and outside finish) to correspond therewith.

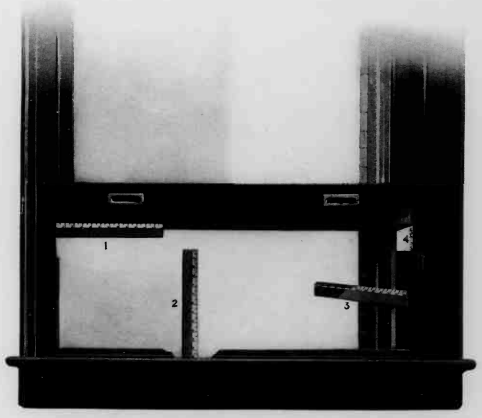


DIAGRAM SHOWING METHOD OF MEASURING

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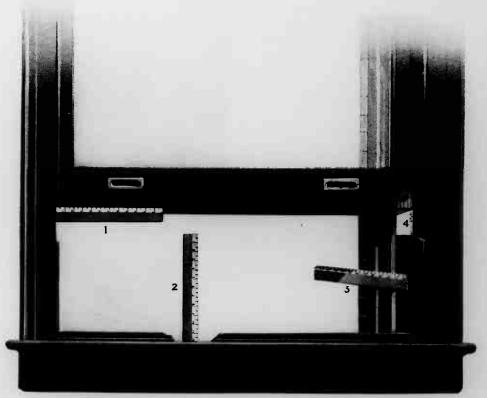
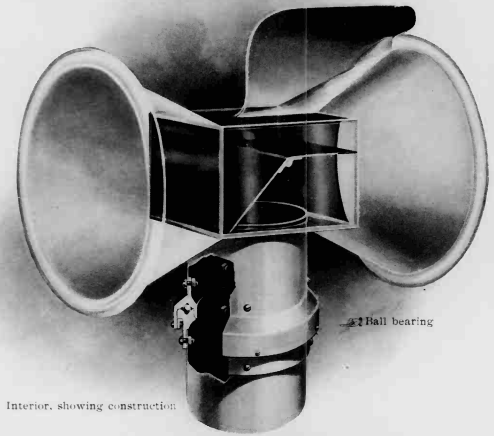


DIAGRAM SHOWING METHOD OF MEASURING

Ariel Ventilator

For the Ventilation of Schools, Churches, Theatres, Hospitals, Factories, Dye Houses, Tanneries, Paper Mills, Steamers, Yachts, etc.



Interior, showing construction

ARIEL VENTILATORS APPLIED TO A SKYLIGHT

Exterior

ARIEL VENTILATOR

The Ariel is the highest type of automatic exhaust ventilator constructed. It is made either of copper or galvanized iron. It produces, under all conditions of wind and weather, a constant upward draught, and excludes the elements and all extraneous matter.

The Ariel consists of a cowl with an elongated central body connected at either end with a cone-shaped funnel. The body contains a two-winged valve, which closes automatically against the direct pressure of the wind and opens the passage from the connecting pipe in such a way as to cause a strong upward draught. This is accomplished by the wind striking the closed wing of the valve, which then acts as a deflector, carrying the direct blast upward and over the open wing of the valve with a greatly increased velocity, thus creating an induced draught, on the same principle as the steam syphon lifts water.

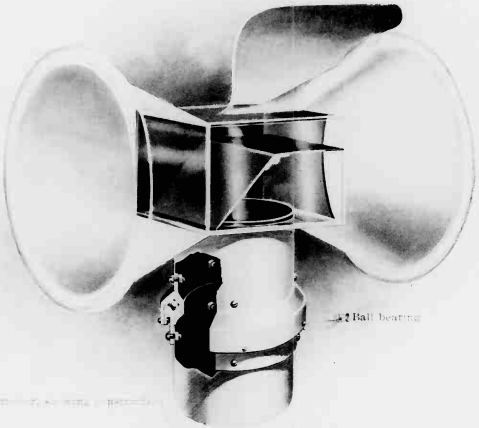
The cowl of the Ariel revolves upon a dust-proof, ball-bearing construction, always assuring the opening of the funnel in direct line with the prevailing air current.

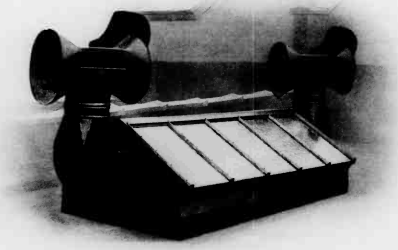
The valve, as stated, forms a constricted passage through the body of the ventilator, compressing the air and increasing its velocity. This action not only creates a strong exhaust, but also prevents dust, dirt, rain, snow, etc., from passing down through the connecting pipe to the room with which it communicates. Therefore the device is thoroughly storm proof. It is made in the following sizes:

Size of pipe, inches . . .	4	6	8	10	12	14	16	18	20	22	24
Capacity, square inches . .	13	28	50	79	113	154	201	255	314	380	452

Ariel Ventilator

For the Ventilation of Schools, Churches, Theatres, Hospitals, Factories, Dye Houses, Tanneries, Paper Mills, Steamers, Yachts, etc.





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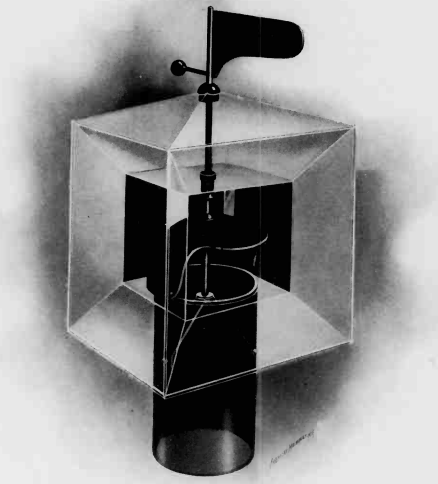
The valve, as stated, forms a constricted passage through the body of the ventilator, compressing the air and increasing its velocity. This action not only creates a strong exhaust, but also prevents dust, dirt, rain, snow, etc., from passing down through the connecting pipe to the room with which it communicates. Therefore the device is thoroughly storm proof. It is made in the following sizes:

Size of pipe, inches	4	6	8	10	12	14	16	18	20	22	24
Capacity, square inches	13	28	50	79	113	154	201	255	314	380	452

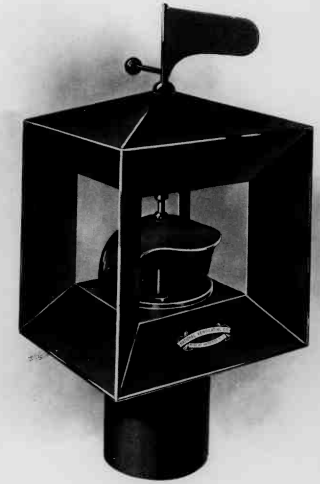
Climax Ventilator

For the Ventilation of Foundries, Machine Shops, Factories, Mills, Outbuildings, etc.



Interior, showing construction

The Climax is made to sell at a moderate price, and is the most efficient ventilator of the cheaper types. It consists of a stationary box-shaped cowl, mounted on a pipe or conduit leading to the space to be ventilated. This cowl is open on all sides to the direct currents of the air, but is so constructed as to form contracted passages or funnels therefor, causing an acceleration in the velocity of the air passing through it, thus creating an induced upward current in the ventilating pipe. This induced current is further augmented by the peculiar form of the rotary valve placed in the body of



Exterior

the cowl, over the end of the pipe or conduit. As the illustration shows, this valve is pivoted and operated by a vane, which effectually cuts off the pipe or conduit from the direct current of the air and further contracts the air passage.

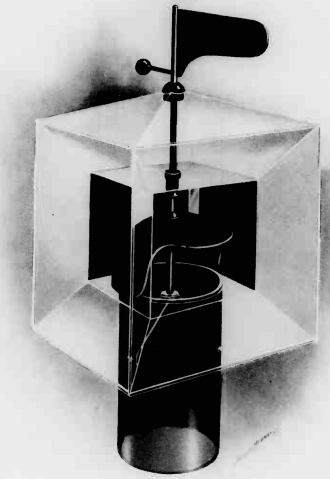
The vane holds the valve in such a position that the convex back of the valve always receives the direct impact of the air. The air after impinging against the valve is deflected, and passes through the contracted space of the body with increasing velocity, and then out through one or more of the sides, thus meeting the ideal conditions to create a strong induced upward current of air through the ventilating pipe or conduit, and effectually removing the foul gases, vapors or vitiated air from the space to be ventilated.

The Climax Ventilator is made in the following sizes:

Size of pipe, inches	4	6	8	10	12	14	16	18	20	22	24
Area, square inches	13	28	50	79	113	154	201	255	314	380	452

Climax Ventilator

For the Ventilation of Foundries, Machine Shops, Factories, Mills, Outbuildings, etc.



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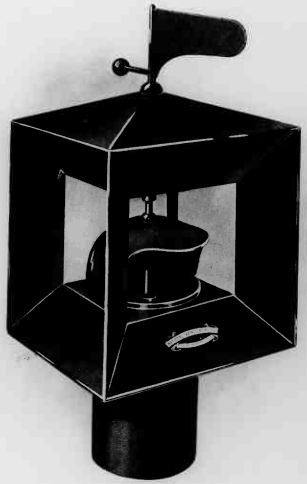

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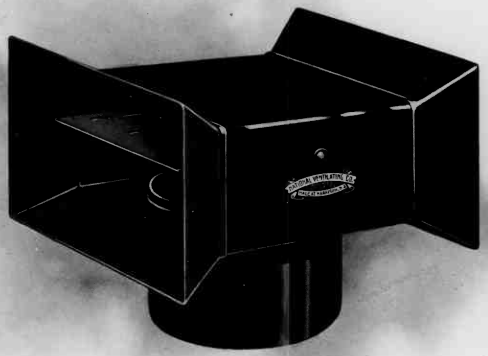
Size of pipe, inches	4	6	8	10	12	14	16	18	20	22	24
Area, square inches	13	28	50	79	113	154	201	255	314	380	452

Reliance Ventilator

For Increasing the Draught of Smoke Flues, Preventing Down Draughts, Curing Smoky Chimneys, etc.



The Reliance is a stationary ventilator in contradistinction to the Ariel, described on pages 38 and 39, which is of the revolving type. The principle on which the valve works is the same in both. The Reliance is attached to the chimney by a heavy galvanized iron base* made to fit the chimney with either an inside or outside flange, and in such a way as to make it impossible for the elements to reach the flue from the outside.

The Reliance Ventilator is made in sizes to fit pipe of the following diameters:

6 8 10 12 14 16 18 20 22 24 inches

* These bases are usually made by the sheet metal worker who erects them. We can, however, furnish them when desired.

National System of Ventilation

As Applied to Cars

IT is an accepted fact that the polluted air in crowded railway and street cars is one of the most potent factors in breeding consumption, pneumonia, influenza and kindred ills, and that travelling, which should be a pleasure and refreshment, becomes a bar to comfort and a menace to health because of the foul and poisonous air that usually prevails in the cars.

The question of car ventilation is one of the most difficult problems presented to the sanitary engineer. Standard authorities set one hundred cubic feet as the breathing space that should be allotted to a person in order to maintain health. If this standard were maintained, the limit of passengers in an ordinary street car would be, say, sixteen to twenty persons. During the rush hours, however, the cars are crowded to their utmost capacity. Every seat is filled, the aisles are packed and the platforms jammed. Under such conditions the air becomes inexpressibly foul, not only from the human exhalations and the effete products thrown off from the body, but often, also, from the greater or less filth that it is the province of the bath or laundry tub to remove.

When it is realized that each passenger's breath contains five per cent. of carbonic acid and that he "destroys or renders poisonous 15.83 cubic feet of air per hour" (Hartley), it is easy to understand the tremendous problem of removing the foul and vitiated atmosphere, and supplanting it with fresh air without creating disagreeable and dangerous draughts, especially in severe weather, when it is well nigh impossible, under ordinary conditions, to warm a volume of fresh air requisite to maintain a wholesome atmosphere.

As Professor Woodbridge suggests, the body of an average adult, standing or sitting in a car, in an atmosphere 20 degrees cooler than itself, generates as much heat as a good sized candle, and will, in the same manner as a burning candle, produce its own ventilating draught, sending the spent products of respiration and transpiration speedily upward and away

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As Professor Woodbridge suggests, the body of an average adult, standing or sitting in a car, in an atmosphere 20 degrees cooler than itself, generates as much heat as a good sized candle, and will, in the same manner as a burning candle, produce its own ventilating draught, sending the spent products of respiration and transpiration speedily upward and away

and drawing to itself a continuous supply of fresh air if it be provided.

All that is needed for perfect ventilation in such a case is an ample supply of fresh air in a state of rest, *i. e.*, without draught, about the person, and a goodly number of small openings (rather than a few large ones) for the approach of such air to, and ample means of escape for the vitiated air that rises up and from, the person.

These are precisely the conditions the National System secures. Its principle is to inject *without draught* only about as much air as is actually consumed, and to extract only about as much foul air as is actually created, and to do it in such a manner that the foul exhalations do not to any extent mix with the fresh air supply. Under these ideal conditions, it will be readily understood that the volume of fresh air necessary to maintain good ventilation is reduced to a minimum, as is also the expense of warming it to any degree desired.

To a large extent the National System of Car Ventilation is antomatic in its action, and is more or less elastic; that is, conditions of health, age, weight of clothing, personal idiosyncrasies, etc., can be better met by the National System than by any other, from the fact that each passenger can control as he pleases the supply of fresh air in his zone, and yet not affect other passengers, or interfere with the general results of the ventilating system.

The illustrations on pages 48, 49 and 50 show the National System of Natural Ventilation installed in a parlor smoking car, and in a train of the Brooklyn Heights Railroad Company. After most severe tests under all conditions, and in competition with several other methods, the National System was recently adopted by the Brooklyn Rapid Transit Company, and orders were given for the equipment of more than one hundred cars. As to the result of this equipment, see testimonial, page 56.

Auto Roof Ventilator for Cars

This device is a modification of the Ariel and Reliance Ventilators, described on pages 38, 39 and 42, and works upon the same general principle. It is designed for attaching to the roof of the car (see illustration, page 50), and is especially valuable for the ventilation of fruit and cattle cars and of passenger cars having flat roofs without decks.

The positive ventilating qualities of the Auto Roof Ventilator have been fully demonstrated by exhaustive tests and several months' careful observation by the Brooklyn Heights Railroad Company. (See testimonial, page 56.)

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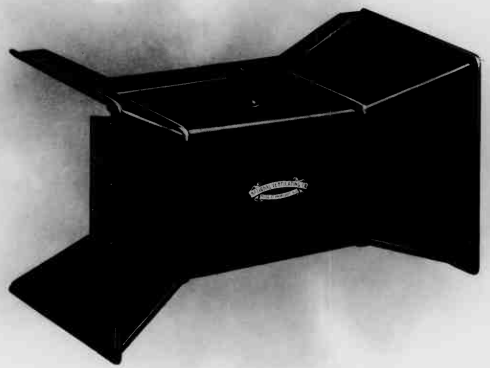
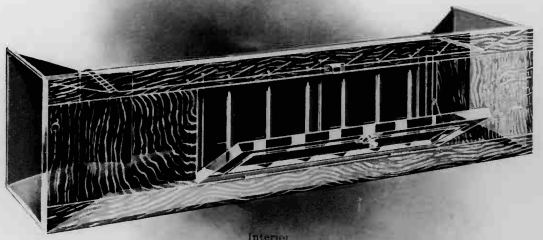
Auto Deck Ventilator for Cars



The Auto Deck Ventilator is another modification of the Ariel and Reliance Ventilators, and is designed to be installed over alternating sash in the deck of the car. The work it accomplishes is practically the same as that of the Auto Roof Ventilator, described on the preceding page. Installed in the deck of the car alone, it gives excellent results; but when supplemented by Mobile Ventilators placed in the sash-rails, especially of sleeping, smoking and parlor cars (see illustrations, pages 48 and 49), ideal and perfect ventilation is assured, the lower devices operating chiefly for the admission of fresh air and the upper ones for the extraction of foul air.

Multiplex Deck Ventilator for Cars



Interior

The Multiplex has a series of movable shutters or louvres that are operated automatically by the air currents, and are so constructed that the air passing through the ventilator, on account of the increased area of the opening and the series of louvres, creates a strong induced current and extracts a large volume of foul air. The exit of the air is under the perfect control of the conductor by means of the deck transoms, which may be opened or closed to any degree desirable. The Multiplex is especially adapted for the ventilation of street and trolley cars, where the frequent opening of the doors provides adequately for the admission of fresh air.

Exterior

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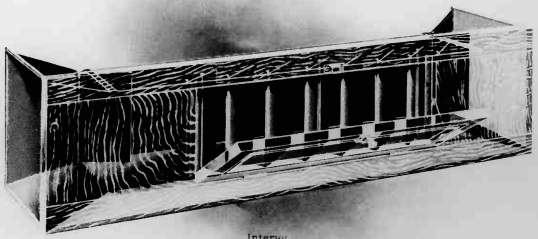

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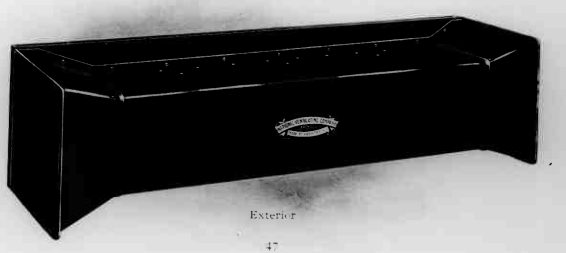


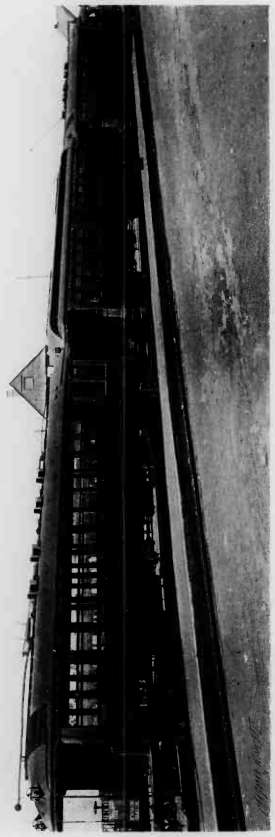
Exterior

PARLOR SMOKING CAR, EQUIPPED WITH MOBILE VENTILATORS INSTALLED IN THE SASH-RAILS, AND MULTIPLEX VENTILATORS INSTALLED IN THE DECK

INTERIOR OF PARLOR SMOKING CAR, SHOWING NATIONAL DEVICES INSTALLED IN SASH-RAILS AND DECK

PARLOR SMOKING CAR, EQUIPPED WITH MOORE VENTILATORS INSTALLED IN THE VESTIBULE AND MCCARDELL VENTILATORS INSTALLED ON THE DECK

INTERIOR OF CAFE OBSERVATION CAR, SHOWING NATIONAL BRASS ASSEMBLY AT EACH SIDE OF THE DECK



BROOKLYN RAPID TRANSIT TRAIN, EQUIPPED WITH AUTO ROOF DEVICES

Testimonials

THE ANSONIA BRASS AND COPPER COMPANY
99 JOHN STREET, NEW YORK

NATIONAL VENTILATING COMPANY
1 Madison Avenue, City

Dear Sirs—Prior to adopting your system of ventilation, we had suffered considerable discomfort owing to the lack of pure air in our offices. The old ventilators never gave satisfactory results. We now have twenty-two windows in our offices equipped with National Ventilators, which provide plenty of fresh air, and at the same time do away with the annoying, if not dangerous, draughts so noticeable in other systems of ventilation. Your ventilators are proving highly satisfactory, and we shall be glad to have you refer any one to us, or bring prospective customers to our office to inspect your system. Very truly yours,

THE ANSONIA BRASS AND COPPER COMPANY
R. A. COWLES, Treasurer

THE ANSONIA CLOCK COMPANY
99 JOHN STREET, NEW YORK

NATIONAL VENTILATING COMPANY
1 Madison Avenue, City

Gentlemen—The ventilators which you have placed in our sales room are very satisfactory, and they answer fully the purpose for which they are intended. Yours truly,

THE ANSONIA CLOCK COMPANY
J. SCHWEIZER, Agent

BENNETT, SLOAN & CO.
IMPORTERS AND JOBBERS
HUDSON AND FRANKLIN STREETS, NEW YORK

NATIONAL VENTILATING COMPANY
1 Madison Avenue, New York

Dear Sirs—We are pleased to say to you that the ventilators you placed in our office in December last are a great success. Among the people in our office are some who belong to the class that must have fresh air; they formerly required that a window should remain open for their accommodation. We have others who are greatly annoyed when in a draught; they required the windows closed. Your system of ventilation has been the means of satisfying both the "fresh air" and the "anti-draught" people, which indicates to us that it fully accomplishes all that you claim for it. Yours very truly,

BENNETT, SLOAN & CO.
ALFRED P. SLOAN, President

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BENNETT, SLOAN & CO.
ALFRED P. SLOAN, President

MONROE COUNTY
SUPERINTENDENT OF THE POOR'S OFFICE
ROCHESTER, N. Y.
CLARENCE V. LODGE, Superintendent

NATIONAL VENTILATING COMPANY, New York

Gentlemen—Referring to the ventilating devices with which you have equipped the Monroe County Almshouse: It is the most satisfactory method of which I have any knowledge of introducing the fresh, outside air into a building. We find that the amount of fresh air introduced into our rooms is only limited by the amount of radiation provided to warm it. I can cheerfully recommend your ventilating devices where needed.

Respectfully yours,

C. V. LODGE
Superintendent of the Poor

OFFICE PURCHASING AGENT OF MONROE COUNTY
ROCHESTER, N. Y.

NATIONAL VENTILATING COMPANY
1 Madison Avenue, New York

Gentlemen—I beg to advise you that the Monroe County Grand Jury, upon its recent investigation of the buildings at the County Almshouse and the County Jail, took occasion to remark upon the satisfactory condition of the ventilation of these buildings. The faulty ventilation of the same buildings had been the subject of unfavorable comment by a former grand jury, prior to the installation of your system of ventilation in same. I have also had favorable reports in this matter from the custodians of these buildings. Yours very truly,

RICHARD GARDINER, Purchasing Agent

CARNEGIE STEEL COMPANY
125 MILK STREET, BOSTON, MASS.

NATIONAL VENTILATING COMPANY
101 Tremont Street, Boston

Gentlemen—We are pleased to advise you that the ventilators placed in our office are working very satisfactorily.

Yours respectfully, CARNEGIE STEEL COMPANY
WILBUR SARGENT LOCKE, Manager of Sales

THE PROVIDENT LIFE AND TRUST COMPANY OF PHILADELPHIA
TRUST DEPARTMENT, PHILADELPHIA, PA.

NATIONAL VENTILATING COMPANY, Philadelphia

Gentlemen—The National Ventilators installed in our building last fall proved very satisfactory, doing all you promised for them, giving plenty of fresh air without draughts.

Yours truly, JOHN B. VAN BAUN

THE ALBANY TRUST COMPANY
ALBANY, N. Y.

KIELEY & STAHL.
Albany, N. Y.

Gentlemen—In reply to your esteemed favor of the 5th instant, I would say that we are very much pleased with the ventilating system installed by the National Ventilating Company in our new bank building, and believe this system to be superior to any we have ever seen.

Yours truly, H. G. YOUNG, President

MERCHANTS BANK OF ROCHESTER
ROCHESTER, N. Y.

NATIONAL VENTILATING COMPANY, New York

Dear Sirs—We are entirely satisfied with the results obtained from the use of your ventilators. The air in our bank is kept pure and fresh without the necessity of opening the doors and windows, and we take pleasure in attesting to the excellence of the system.

Yours truly. P. R. MCPHAIL, President

THE PENN MUTUAL LIFE INSURANCE CO. OF PHILADELPHIA, PA.
PENN MUTUAL BUILDING, BOSTON, MASS.

NATIONAL VENTILATING COMPANY
Boston, Mass.

Gentlemen—Answering your inquiry, we beg to say that the ventilators which you installed in our offices last fall have been thoroughly satisfactory, and we believe them to be the very best ventilating device on the market. We have had pleasure in recommending them to a number of our friends, who will bear witness to the fact that they do all that you claim for them. Very truly yours,

PLYMPTON & BUNTING, General Managers

THE TRADERS NATIONAL BANK
ROCHESTER, N. Y.

NATIONAL VENTILATING COMPANY
1 Madison Avenue, New York City

Gentlemen—We take pleasure in stating that the ventilating system installed by you in our premises has given excellent satisfaction. The difference in the air is quite noticeable, and we are sure that the conditions as regards health are very much improved.

Very truly yours. C. E. BOWEN, Cashier

OAKLAND DISTRICT SCHOOL BOARD

PITTSBURG, PA.

NATIONAL VENTILATING COMPANY

1 Madison Avenue, New York

Gentlemen—The National Ventilators installed in our three school buildings, the Holmes, Bellefield and Soho, have proved a decided success, furnishing a constant and abundant supply of fresh air, without objectionable draughts. We cordially commend their use.

Yours truly,

A. C. SHAW, Secretary

SECOND WARD SCHOOL BOARD

PITTSBURG, PA.

NATIONAL VENTILATING COMPANY

1 Madison Avenue, New York

Gentlemen—It is a pleasure for us to state that the ventilators you placed in all the rooms of our school building have proved satisfactory, and we highly recommend them. We find that they give us a good circulation of air without a draught, and exclude the greater part of dust and smoke. Our building has been much cleaner, and also has been heated at a less expense than before ventilators were installed. We are,

Very respectfully,

W. D. STOCKDALE, Secretary

MT. ALBION SCHOOL BOARD

PITTSBURG, PA.

NATIONAL VENTILATING COMPANY

1 Madison Avenue, New York, N. Y.

Gentlemen—It affords us great pleasure to state that the ventilators placed in our three school buildings have proved satisfactory in every respect. We have plenty of fresh air, free from dust, smoke and draught. Also can heat the building with less expense.

Very respectfully,

JOHN H. MAHONEY, Secretary

RESERVE TOWNSHIP SCHOOL BOARD

ALLEGHENY, PA.

NATIONAL VENTILATING COMPANY

1 Madison Avenue, New York

Gentlemen—We take pleasure in sending you herewith our check for the ventilators installed in our different schools, and beg to add that of all the money disbursed by our district, this amount is the one from which we have derived the greatest benefit. The entire board joins me in recommending the ventilators most strongly. Our schools, since their installation, are well ventilated (without draught), which adds materially to the comfort and working capacity of the children.

Yours very truly, W. G. WEITERSHAUSEN

President of the Board

HOLMES PUBLIC SCHOOL, OAKLAND DISTRICT, PITTSBURG, PA.

One of many ventilated by the National System. See testimonials, page 54

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DEPARTMENT OF THE INTERIOR UNITED STATES GEOLOGICAL SURVEY
WASHINGTON, D. C.

NATIONAL VENTILATING COMPANY
1 Madison Avenue, New York City

Dear Sirs—I have been using your ventilating device in the windows of my office for the past two months, and am greatly pleased with its operation. It supplies an abundance of fresh air without any appreciable draught. The device is also well constructed, attractive in appearance, and affords the best means, to my knowledge, for thoroughly ventilating a room. Yours truly, HENRY GANNETT, Geographer

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BROOKLYN RAPID TRANSIT COMPANY
168 MONTAGUE STREET, BROOKLYN, N. Y.

NATIONAL VENTILATING COMPANY, New York City

Gentlemen—The ventilating devices with which our offices were fitted several months ago have proven most satisfactory. They do all that you claim for them, excluding the dust and the elements and giving a constant and abundant supply of fresh air, yet with absolute freedom from draughts even in the severest weather. The results warrant our hearty endorsement of your system.

Yours truly, J. F. CALDERWOOD
Vice-President and General Manager

THE BROOKLYN HEIGHTS RAILROAD COMPANY

NATIONAL VENTILATING COMPANY, New York City

Gentlemen—Several months' use of your ventilators on more than one hundred of our cars warrants my hearty endorsement of their efficiency. The devices thoroughly ventilate the cars without permitting any draught objectionable to the passengers, and I take great pleasure in recommending your system to all railways seeking thorough ventilation of their cars. Yours truly,

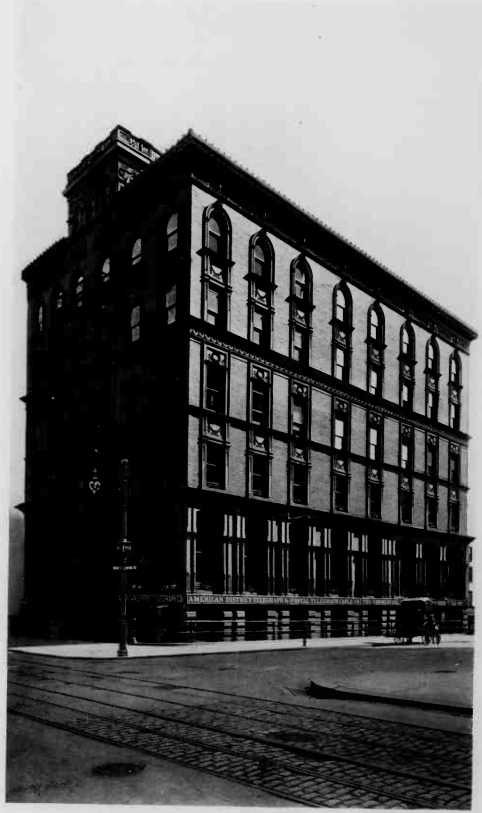
R. C. TAYLOR, Mechanical Engineer

SNOW, CHURCH & CO., LAW AND COLLECTIONS
509-515 CALVERT BUILDING, BALTIMORE

NATIONAL VENTILATING COMPANY

Gentlemen—We have used your National Ventilators in our suite of offices for the past four or five months, and can say that they have given entire satisfaction. We cheerfully recommend them to those who desire their offices well ventilated and kept free from dust.

Yours very truly, SNOW, CHURCH & Co.
G. W. WARD, Manager



BROOKLYN RAPID TRANSIT BUILDING, BROOKLYN
See testimonial, page 56

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Yours truly, J. F. CALDERWOOD,
Vice-President and General Manager

THE BROOKLYN HEIGHTS RAILROAD COMPANY

NATIONAL VENTILATING COMPANY, New York City

Gentlemen—Several months' use of your ventilators on more than one hundred of our cars warrants my hearty endorsement of their efficiency. The devices thoroughly ventilate the cars without permitting any draught objectionable to the passengers, and I take great pleasure in recommending your system to all railways seeking thorough ventilation of their cars. Yours truly,

R. C. TAYLOR, Mechanical Engineer

SNOW, CHURCH & CO., LAW AND COLLECTIONS
509-515 CALVERT BUILDING, BALTIMORE

NATIONAL VENTILATING COMPANY

Gentlemen—We have used your National Ventilators in our suite of offices for the past four or five months, and can say that they have given entire satisfaction. We cheerfully recommend them to those who desire their offices well ventilated and kept free from dust.

Yours very truly, SNOW, CHURCH & CO.
G. W. WARD, Manager

BROOKLYN RAPID TRANSIT BUILDING, BROOKLYN
See testimonial, page 56

BOSTON CITY HALL

See testimonials, pages 58 and 59

EDWARD J. DONOVAN, CITY CLERK, CITY CLERK'S OFFICE
CITY HALL, BOSTON, MASS.

NATIONAL VENTILATING COMPANY

1 Madison Avenue, New York City

Gentlemen—About a year ago a number of your ventilators were installed in this office, and have given complete satisfaction. Prior to their installation, the ventilation here was very unsatisfactory. I am pleased to recommend them, and am satisfied that wherever they may be placed the same satisfaction will follow their introduction as has been attained here. Very respectfully yours,

EDWARD J. DONOVAN, City Clerk

CITY OF BOSTON, STREET COMMISSIONERS' OFFICE, CITY HALL

NATIONAL VENTILATING COMPANY

Gentlemen—We have had your ventilators in use in our office for the last year, and we like them very much, and cheerfully recommend them to all parties. Very respectfully yours, SALEM D. CHARLES
Chairman Board of Street Commissioners

OFFICE OF THE WATER COMMISSIONER, CITY HALL, BOSTON

NATIONAL VENTILATING COMPANY

101 Tremont Street, Boston

Gentlemen—The ventilators you placed in my office have proved entirely satisfactory, the improved condition of the air being most marked. They work at night as well as day, and so insure a fresh and wholesome atmosphere to commence work upon in the morning.

Yours very truly, E. S. SULLIVAN, Commissioner

CLERK OF COMMITTEES DEPARTMENT, CITY HALL, BOSTON

NATIONAL VENTILATING COMPANY, Boston

Gentlemen—We are very much pleased with your ventilators. They substitute, without draught, fresh, invigorating air for the foul air that prevailed in our offices before the installation of your system, and must of necessity add to the capacity of the employees to do good and efficient work. I can highly recommend them as a perfect means of ventilation. Yours very truly, JOHN F. DEVER, Clerk of Committees

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CITY MESSENGER DEPARTMENT, CITY HALL, BOSTON

NATIONAL VENTILATING COMPANY

1 Madison Avenue, New York City

Gentlemen—We take pleasure in endorsing the National System of Ventilation. In our opinion it is the most rational one yet presented, as it is in accord with nature's methods, and insures fresh air and perfect ventilation without draught. We heartily commend it.

Respectfully yours, EDWARD J. LEARY, City Messenger

BOSTON INSURANCE COMPANY, BOSTON, MASS.
(Capital, $1,000,000)

NATIONAL VENTILATING COMPANY, New York

Dear Sirs—The system of ventilators with which you equipped our office last year has proved to be entirely satisfactory, the work having been done in a thorough manner, and it is evident that they accomplish all that has been claimed for them. We most heartily endorse the system.

Yours truly, E. WINCHESTER, Fire Manager

BOSTON CITY HALL

See testimonials, pages 58 and 59

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Yours truly, E. WINCHESTER, Fire Manager

STANDARD GAS LIGHT COMPANY OF THE CITY OF NEW YORK
61–63 EAST 59TH STREET, NEW YORK

NATIONAL VENTILATING COMPANY
1 Madison Avenue, City

Dear Sirs—We wish to testify to the exceeding efficiency of the devices which you have installed in our offices, Nos. 61–63 East 59th Street, for the purpose of ventilating same. The results are eminently satisfactory, and have fully borne out your statements as to the securing of perfect ventilation and in every other particular.

Yours very truly,

THE STANDARD GAS LIGHT COMPANY
W. G. HOYT, Vice-President

LIBRARY OF THE NEW YORK LAW INSTITUTE
POST OFFICE BUILDING, NEW YORK CITY

NATIONAL VENTILATING COMPANY
1 Madison Avenue, New York

Dear Sirs—The ventilation of the library rooms by your system has been perfectly satisfactory in every particular. A test of several months has demonstrated the entire efficiency of the devices. They keep the air uniformly pure and sweet, and even in the coldest weather we are free from draughts and require no additional heat. Our experience warrants an unqualified endorsement of your system.

Sincerely yours, WILLIAM H. WINTERS, Librarian

WILLIAM D. JOHNSON, ARCHITECT
26 STATE STREET, HARTFORD, CONN.

NATIONAL VENTILATING COMPANY
26 State Street, City

Gentlemen—The ventilators which you installed in my office windows are giving excellent satisfaction. The air in the drafting room is very much improved since they were in. For about a month from the middle of August I kept a record of temperature which showed a variation of only five degrees during that time, although the outside temperature varied over twenty degrees. I believe they fill a long felt need.

Yours truly, WM. D. JOHNSON

SIMONSON & PIETSCH, ARCHITECTS
AMERICAN BUILDING, BALTIMORE, MD.

NATIONAL VENTILATING COMPANY
New York

Gentlemen—We take pleasure in stating that we are using your ventilating system, which is giving excellent results. We shall continue to use it. Respectfully SIMONSON & PIETSCH

NEW YORK EDISON BUILDING, NEW YORK CITY
Ventilated by the National System

STANDARD GAS LIGHT COMPANY OF THE CITY OF NEW YORK
61-63 EAST 59TH STREET, NEW YORK

NATIONAL VENTILATING COMPANY
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NEW YORK EDISON BUILDING, NEW YORK CITY
Ventilated by the National System

STANDARD SANITARY MANUFACTURING COMPANY
PITTSBURG, PA.

NATIONAL VENTILATING COMPANY
715 Empire Building, Pittsburg

Gentlemen — Referring to your inquiry in regard to the satisfaction which your ventilators have given us, will say that these were installed some months ago in the swinging windows of our offices, and we are well satisfied with the results. Yours very truly,

STANDARD SANITARY MANUFACTURING COMPANY
Per E. F. GREGG, ASSISTANT TO FIRST VICE-PRESIDENT

GEORGE FROST COMPANY
551 TREMONT STREET, BOSTON, MASS.

NATIONAL VENTILATING COMPANY
101 Tremont Street, Boston

Gentlemen — We take pleasure in saying that the ventilators you installed in our office a few months ago, have worked very satisfactorily inasmuch as they admit fresh air without causing a draught.

Yours very truly,
GEORGE FROST COMPANY
GEORGE H. PHELPS, Treasurer

GINN & CO.
PUBLISHERS OF SCHOOL AND COLLEGE TEXT BOOKS
70 FIFTH AVENUE, NEW YORK

NATIONAL VENTILATING COMPANY
1 Madison Avenue, New York City

Gentlemen—A thorough test of your ventilating system in our New York offices, extending through several months, enables us to certify to its entire efficiency. The uniform freshness of the air within, and the exclusion of dust and smoke and of the elements, combined with the automatic action of the devices and the freedom from draughts, confirm all your claims and warrant our cordial endorsement of the system.

Yours very truly, GINN & CO.

INTERNATIONAL SHIP COPPERING COMPANY
DEVONSHIRE BUILDING
16 STATE STREET, BOSTON, MASS.

NATIONAL VENTILATING COMPANY
1 Madison Avenue, New York

Gentlemen—I beg to advise you that the ventilating devices put into our office and also at my residence, have given the fullest satisfaction. They require no attention, work to perfection, keeping the air uniformly fresh and allowing no draught, and I would not be without them for many times their cost. Yours very truly,

INTERNATIONAL SHIP COPPERING COMPANY
GEO. D. COLEMAN, President

REAL ESTATE MANAGEMENT COMPANY
7 EAST 42ND STREET, NEW YORK

NATIONAL VENTILATING COMPANY
1 Madison Avenue, New York City

Gentlemen—It gives us pleasure to advise you that a thorough test of your ventilators has demonstrated their efficiency to our entire satisfaction. They make a great change in the atmosphere of our offices, and require no additional attention whatever, being wholly automatic in their action. You are at liberty to refer to us at any time.

Yours respectfully, REAL ESTATE MANAGEMENT COMPANY
D. J. MCCOMB, President

D. C. PERCIVAL & CO.
WHOLESALE DEALERS IN WATCHES AND DIAMONDS
JEWELERS BUILDING, BOSTON, MASS.

NATIONAL VENTILATING COMPANY

Gentlemen—We take pleasure in informing you that we are entirely satisfied with the results obtained by your installation in our office of twenty-one ventilators. Before these ventilators were put in we found it difficult to receive a sufficient amount of fresh air without draught.

Yours respectfully, D. C. PERCIVAL & CO., INC.
D. C. PERCIVAL, JR., Treas.

JOSEPH BURNETT COMPANY
36 INDIA STREET, BOSTON, MASS.

NATIONAL VENTILATING COMPANY

Gentlemen — About one year ago we were induced to make a trial of your ventilators and had six of them installed in our office, it being heated by steam. We have found during the past winter the air better and pleasanter than ever before, without a direct draft to annoy any one.

Yours very truly, JOSEPH BURNETT COMPANY
JOSEPH BURNETT, Asst. Treasurer

JOHN HANCOCK MUTUAL LIFE INSURANCE COMPANY
BOSTON, MASS.

NATIONAL VENTILATING COMPANY
101 Tremont Street, Boston

Gentlemen—In reply to your inquiry in regard to the window ventilators recently installed in my office, I have to say that they have given me satisfaction and seem to be all that is claimed for them.

Very truly yours, WALTON S. CROCKER

T. P. Howell & Company

Manufacturers of the Lion Brand Furniture and Harness Leathers

Newark, N. J.

National Ventilating Company, New York

Gentlemen—It is with pleasure that we say we have now in use a number of your Ariel Ventilators throughout our works, and that we have found them to give perfect satisfaction, and gladly recommend them to any one needing such devices.

Yours truly, T. P. Howell & Company
James Smith, President

Ransom N. Fitzgerald, Collector

Halls of Record, Hartford, Conn.

National Ventilating Company

Gentlemen—The three ventilators made by your company which I have been using in my office here have been very satisfactory. They afford a free circulation of fresh air, and we have no annoyance from dust or draught. I cheerfully recommend their use.

Yours respectfully, R. N. Fitzgerald, Collector

Willis & Mason, Building Construction

22 East Lexington Street, Baltimore

National Ventilating Company

Gentlemen—The ventilators we placed in Elks Hall are giving entire satisfaction in every respect, and are in our opinion superior to anything in the market in the ventilator line. We feel confident that the Elks will have your system of ventilating installed throughout their entire building in the near future.

Yours respectfully, Willis & Mason

The Monticello Distilling Company

Baltimore, Md.

Messrs. Willis & Mason, Baltimore, Md.

Gentlemen—I find the work in reference to the ventilators in the Elks lodge room has been satisfactorily completed, and have heard nothing but praise from all the members.

Yours respectfully, Jacob Hahn

The New Haven County National Bank

New Haven, Conn.

National Ventilating Company, New York

Gentlemen—I take pleasure in stating that the ventilating system you installed for us has given good satisfaction, and we are pleased to recommend it to all interested in pure air.

Yours very truly, H. G. Redfield, Cashier

MSH 20586

END OF
TITLE